



LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA5 | Northolt Corridor

Data appendix (LQ-001-005)

Land quality

November 2013

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Department for Transport

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1 Introduction

1.1.1 The land quality appendix for the Northolt Corridor study community forum area (CFA5) comprises:

- a summary of engagement undertaken (Section 2);
- detailed risk assessment (Section 3);
- inspection notes and other site data (Section 4);
- geological sites of special scientific interest (SSSI) or regionally important geological sites (RIGS)(Section 5); and
- mining and minerals data (Section 6).

1.1.2 Maps referred to throughout the land quality appendix are contained in Map LQ-01-006 to LQ-01-008 in Volume 5, Land Quality Map Book.

2 Engagement

- 2.1.1 Table 1 sets out the local authorities and other organisations that have been engaged with during the preparation of the land quality section of the environmental impact assessment (EIA) for this study area, the types of information that have been provided to the assessment team and any specific concerns of those with whom the team engaged.

Table 1: Engagement on land quality issues undertaken for Northolt study area

Local authority or other organisation	Method/dates of contact	Information provided and/or specific concerns
Environment Agency	Contact via email on: 24 April 2013; 15 May 2013; 24 May 2013; 12 June 2013; 14 June 2013; 27 June 2013; and 08 July 2013.	No information received that relates to the study area.
London Borough of Ealing (LBE)	Contact via email on: 31 October 2012; 17 December 2012; and 23 January 2013.	No response received other than a response to the reminder email sent out on 17 December 2012 which stated that the request would be looked into. No response to email received.

Local authority or other organisation	Method/dates of contact	Information provided and/or specific concerns
London Borough of Brent (LBB)	<p>Contact via email on 31 October 2012; 01 November 2012; 05 December 2012; 21 February 2013; and 22 February 2013.</p> <p>Contact via telephone on: 14 November 2012.</p>	<p>From the initial contact email sent out detailing the details of the search request LBB requested clarification on the scope of search. Clarification was given in a subsequent telephone conversation. It was discussed that the sites in the assessment area within LBB did not give cause for concern if they remained in their current low sensitivity use (i.e. not developed for housing or parks). The LBB advised that it was likely that the 'typical' contamination was expected of former industrial sites in the borough (i.e. contamination with heavy metals and metalloids, hydrocarbons and polycyclic aromatic hydrocarbons (PAH) including benzo(a)pyrene). It was agreed to submit a revised and reduced search area. This was sent on 21 February 2013. A response was received from LBB which confirmed that there were no sites within the borough that are determined to be contaminated land under Part IIA¹ of the Environmental Protection Act 1990 and there are no sites in the process of being determined as such. A response based on the revised search area provided on 21 February 2013 detailed that Area 1 (Alperton) is identified under the Contaminated Land Inspection Strategy as having potentially contaminative historic uses and that the area is a low priority for inspection by the council. In relation to Area 2 (Park Royal) this area is also identified under the Contaminated Land Inspection Strategy as having potentially contaminative historic uses and the area is currently a low priority for inspection by the council. In addition LBB confirmed that the eastern half of the site was once occupied by the Guinness Brewery which has been remediated to a level suitable for industrial/commercial use. Within Area three (Kensal Green) a number of areas have been identified under the Contaminated Land Inspection Strategy, situated on Salusbury Road, Albert Road and Kilburn Lane.</p>
London Fire Brigade (LFB)	<p>Contact via email on: 12 June 2012.</p>	<p>Contact was made by email initially, followed by a telephone conversation with LFB regarding two sites that had been identified as potentially having petroleum storage facilities within their boundaries.</p> <p>A petroleum storage facility enquiry was directed to the LFB for the following sites:</p> <ul style="list-style-type: none"> 1) IBM UK Ltd, Greenford Green Business Park, Greenpark Way, UB6 0AD; and 2) Vacant plot of land, Greenpark Way, UB6 0GG. <p>The LFB had no record of petroleum storage for either site.</p>

¹ Environmental Protection Act 1990, Part IIA, Introduced in England on 1 April 2000, London, Her Majesty's Stationery Office.

3 Detailed risk assessment

3.1.1 This section presents assessments for the higher risk potentially contaminated sites within the study area. For each site the following data is presented:

- baseline risk assessment;
- construction risk assessment;
- post-construction risk assessment; and
- assessment of temporary (construction) and permanent (post-construction) effects.

3.1.2 This risk assessment incorporates the following assumptions:

- construction workers are not included as part of this assessment;
- sites that have been assessed as potentially posing a contaminative risk to the Proposed Scheme have been grouped and considered together where appropriate. It should be noted that some parcels of land may have had several land uses from different epochs;
- during construction standard mitigation procedures will be in place in accordance with the draft Code of Construction Practice (CoCP) (Volume 5: Appendix CT-003-000); and
- during the post-construction condition it is assumed that all required remediation has been undertaken and validated.

3.1.3 The sites assessed in this study area are shown on Maps LQ-01-006 to LQ-01-008 (Volume 5, Land Quality Map Book).

Table 2: Sites included in the detailed risk assessment within the Northolt Corridor study area

Site reference	Land use	Table reference
5-114	Rail land	3,10,17,24
5-104	Business park	4,11,18,25
5-113	Rail land	5,12,19,26
5-105	Industrial estate	6,13,20,27
5-69	Glass works	7,14,21,28
5-68	White lead works	8,15,22,29
5-112	Rail land	9,16,23,30

- 3.1.4 Contaminant types included within the risk assessments are based on the Priority Contaminants Report CLR 8². Although withdrawn, this document is still commonly used and is considered as good practice.
- 3.1.5 The remainder of this appendix presents the risk assessment for the sites set out in Table 2. The following abbreviations are used in these tables:
- CSM - conceptual site model;
 - PAH - polycyclic aromatic hydrocarbons; and
 - PCB - polychlorinated biphenyls.

² Defra and Environment Agency, (2002), *Potential contaminants for the assessment of land- R&D Publication*, Bristol, Environment Agency.

3.1 Baseline risk assessment

Table 3: Summary CSM for on-site rail land overlying a superficial aquifer at the West Gate shaft site during baseline (Ref ID 5-114)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, fuel hydrocarbons and PAHs	Site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	Taplow Gravel Formation	Lateral and vertical migration of mobile contaminants	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Table 4: Summary CSM for on-site business park overlying a superficial aquifer at the West Gate shaft site during baseline (Ref ID: 5-104)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Contamination from on-going activities: including aromatic hydrocarbons, waste oils, fuels, solvents	Site users - such as workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	River Brent	Leaching of soluble contaminants or migration of liquid contaminants	Low likelihood	Minor	Low
	Taplow Gravel Formation	Lateral and vertical migration of mobile contaminants	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Table 5: Summary CSM for on-site rail land at the Greenpark Way site during baseline (Ref ID: 5-113)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, fuel hydrocarbons and PAH	Site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	Lower aquifer (Secondary A /Principal bedrock aquifer)	Vertical migration of mobile contamination	Unlikely	Medium	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Table 6: Summary CSM for an on-site industrial estate at the Greenpark Way site during baseline (Ref ID: 5-105)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Contamination from on-going activities residual contamination from former activities: hydrocarbons including waste oils, heavy metals and asbestos	Site users - workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Lower aquifer (Secondary A/Principal bedrock aquifer)	Migration of mobile contamination	Unlikely	Medium	Low
	Grand Union Canal	Leaching of soluble contaminants or migration of liquid contaminants	Unlikely	Minor	Very Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Table 7: Summary CSM for an onsite former glass works at the Greenpark Way site during baseline (Ref ID: 5-69)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contamination from former activities: hydrocarbons including waste oils, heavy metals, arsenic, PCB, phenols, and asbestos	Site users - such as workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Lower aquifer (Secondary A/Principal bedrock aquifer)	Migration of mobile contamination	Unlikely	Medium	Low
	Grand Union Canal	Leaching of soluble contaminants or migration of liquid contaminants	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Table 8: Summary CSM for an onsite former white lead works at the Greenpark Way site during baseline (Ref ID: 5-68)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contamination from previous activities: oil/fuel hydrocarbons, acetones, PAH, aromatic hydrocarbons, chlorinated hydrocarbons, PCB, cyanide, organotin compounds, sulphates, sulphur, heavy metals and semi-metals and asbestos	Site users - such as workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Table 9: Summary CSM for off-site rail land at the Mandeville Road shaft site during baseline (Ref ID 5-112)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, fuel hydrocarbons and PAH	Site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

3.2 Construction risk assessment

Table 10: Summary CSM for on-site rail land overlying a superficial aquifer at the West Gate shaft site during construction phase (Ref ID 5-114)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, fuel hydrocarbons and PAH	Future site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Not present during construction		
	Adjacent site users such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	Taplow Gravel Formation	Lateral and vertical migration of mobile contaminants	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Table 11: Summary CSM for on-site business park overlying a superficial aquifer at the West Gate shaft site during construction (Ref ID: 5-104)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Contamination from on-going activities: including aromatic hydrocarbons, waste oils, fuels, solvents	Future site users - such as workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Not present during construction		
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	River Brent	Lateral and vertical migration of mobile contaminants	Low likelihood	Minor	Low
	Taplow Gravel Formation	Leaching of soluble contaminants or migration of liquid contaminants	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Table 12: Summary CSM for on-site rail land at the Greenpark Way site during construction phase (Ref ID: 5-113)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, fuel hydrocarbons and PAH	Site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Not present during construction		
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	Lower aquifer (Secondary A/Principal bedrock aquifer)	Migration of mobile contamination	Unlikely	Medium	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Very low

Table 13: Summary CSM for an on-site industrial estate at the Greenpark Way site during construction phase (Ref ID: 5-105)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Contamination from on-going activities and in made ground: hydrocarbons including waste oils, heavy metals and asbestos	Site users - such as workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Not present during construction		
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Grand Union Canal	Leaching of soluble contaminants or migration of liquid contaminants	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Table 14: Summary CSM for an onsite former glass works at the Greenpark Way site during post construction phase (Ref ID: 5-69)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contamination from former activities: hydrocarbons including waste oils, heavy metals, arsenic, PCB, phenols, and asbestos	Future site users - such as workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Not present during construction		
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Lower aquifer (Secondary A/Principal bedrock aquifer)	Migration of mobile contamination	Unlikely	Medium	Low
	Grand Union Canal	Leaching of soluble contaminants or migration of liquid contaminants	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Table 15: Summary CSM for an onsite former white lead works at the Greenpark Way site during construction phase (Ref ID: 5-68)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contamination from previous activities – oil/fuel hydrocarbons, acetones, PAH, aromatic hydrocarbons, chlorinated hydrocarbons, PCB, cyanide, organotin compounds, sulphates, sulphur, heavy metals and semi-metals and asbestos	Future site users - such as workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Not present during construction		
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	Lower aquifer (Secondary A/Principal bedrock aquifer)	Migration of mobile contamination	Unlikely	Medium	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Table 16: Summary CSM for rail land at the Mandeville Road shaft site during construction phase (Ref ID 5-112)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, fuel hydrocarbons and PAH	Site users (rail staff))	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	Lower aquifer (Secondary A/Principal bedrock aquifer)	Migration of mobile contamination	Unlikely	Medium	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

3.3 Post-construction risk assessment

Table 17: Summary CSM for on-site rail land overlying a superficial aquifer at the West Gate shaft site during post construction phase (Ref ID 5-114)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, fuel hydrocarbons and PAH	Future site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Medium	Low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Taplow Gravel Formation	Lateral and vertical migration of mobile contaminants	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low	Minor	Low

Table 18: Summary CSM for on-site business park overlying a superficial aquifer at the West Gate shaft site during post construction phase (Ref ID: 5-104)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Contamination from on-going activities – including aromatic hydrocarbons, waste oils, fuels, solvents	Future site users - such as workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Minor	Very low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	River Brent	Leaching of soluble contaminants or migration of liquid contaminants	Unlikely	Minor	Very low
	Taplow Gravel Formation	Lateral and vertical migration of mobile contaminants	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Table 19: Summary CSM for on-site rail land at the Greenpark Way site during post construction phase (Ref ID: 5-113)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, fuel hydrocarbons and PAH	Future site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Medium	Low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Lower aquifer (Secondary A/Principal bedrock aquifer)	Migration of mobile contamination	Unlikely	Medium	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low	Minor	Low

Table 20: Summary CSM for an on-site industrial estate at the Greenpark Way site during post construction phase (Ref ID: 5-105)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Contamination from on-going activities residual contamination from former activities: hydrocarbons including waste oils, heavy metals and asbestos	Future site users - such as workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Medium	Low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Lower aquifer (Secondary A/Principal bedrock aquifer)	Migration of mobile contamination	Unlikely	Medium	Low
	Grand Union Canal	Leaching of soluble contaminants or migration of liquid contaminants	Unlikely	Minor	Very Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low	Minor	Low

Table 21: Summary CSM for an onsite former glass works at the Greenpark Way site during post construction phase (Ref ID: 5-69)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contamination from former activities: hydrocarbons including waste oils, heavy metals, arsenic, PCB, phenols, and asbestos	Future site users - such as workers	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Medium	Low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Lower aquifer (Secondary A/Principal bedrock aquifer)	Migration of mobile contamination	Unlikely	Medium	Low
	Grand Union Canal	Leaching of soluble contaminants or migration of liquid contaminants	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low	Minor	Low

Table 22: Summary CSM for an onsite former white lead works at the Greenpark Way site during post construction phase (Ref ID: 5-68)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contamination from previous activities: oil/fuel hydrocarbons, acetones, PAH, aromatic hydrocarbons, chlorinated hydrocarbons, PCB, cyanide, organotin compounds, sulphates, sulphur, heavy metals and semi-metals and asbestos	Future site users - such as maintenance workers	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Medium	Low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and rail areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Lower aquifer (Secondary A/Principal bedrock aquifer)	Migration of mobile contamination	Unlikely	Medium	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low	Minor	Low

Table 23: Summary CSM for site rail land at the Mandeville Road shaft site during post construction phase (Ref ID 5-112)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, fuel hydrocarbons and PAH	Future site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

3.4 Assessment of temporary (construction) and permanent (post-construction) effects

Table 24: Significance of impact during construction/post construction for on-site rail land overlying a superficial aquifer at the West Gate shaft site (Ref ID 5-114)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated waters	Moderate/low	N/A	Low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by inhalation of volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Superficial Aquifers	Moderate/low	Moderate/low	Very low	Negligible	Minor beneficial
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Overall significance				Negligible effect	Negligible to minor beneficial effect

Table 25: Significance of impact during construction/post construction for on-site business park overlying a superficial aquifer post construction at the West Gate shaft (Ref ID: 5-104)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated waters	Moderate/low	N/A	Low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by inhalation volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Minor beneficial
Lateral and vertical migration of mobile contamination into the River Brent	Low	Low	Very low	Negligible	Minor beneficial
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in superficial aquifers	Low	Low	Very low	Negligible	Minor Beneficial
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Very low	Negligible	Minor Beneficial
Overall significance				Negligible	Negligible to minor beneficial effect

Table 26: Significance of impact during construction/post construction for on-site rail land use at the Greenpark Way site (Ref ID 5-113)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated waters	Moderate/low	N/A	Low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by inhalation of volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Potential impact to groundwater quality within the 'lower aquifer' (Secondary A/Principal bedrock aquifer) from shaft construction through London Clay	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Overall significance				Negligible effect	Negligible to minor beneficial effect

Table 27: Significance of impact during construction/post construction for an on-site industrial estate at the Greenpark Way site (Ref ID: 5-105)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated waters	Moderate/low	N/A	Low	N/A	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by inhalation of volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Potential impact to groundwater quality within the 'lower aquifer' (Secondary A/Principal bedrock aquifer) from shaft construction through London Clay	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very Low	Very low	Very Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Overall significance				Negligible effect	Negligible to minor beneficial effect

Table 28: Significance of impact during construction/post construction for an onsite glass works at the Greenpark Way site (Ref ID: 5-69)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated waters	Moderate/low	N/A	Low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by inhalation of volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Potential impact to groundwater quality within the 'lower aquifer' (Secondary A/Principal bedrock aquifer) from shaft construction through London Clay	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Overall significance				Negligible effect	Negligible to minor beneficial effect

Table 29: Significance of impact during construction/post construction for an onsite former white lead works at the Greenpark Way site (Ref ID: 5-68)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated waters	Moderate/low	N/A	Low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by inhalation of volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Potential impact to groundwater quality within the 'lower aquifer' (Secondary A/Principal bedrock aquifer) from shaft construction through London Clay	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Potential impact on property from contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Overall significance				Negligible effect	Negligible to minor beneficial effect

Table 30: Significance of impact during construction/post construction for rail land use at the Mandeville Road shaft site (Ref ID 5-112)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated waters	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Overall significance				Negligible effect	Negligible

4 Inspections notes and other site data

4.1.1 This section presents the following data:

- site inspection notes for those key potentially contaminated sites visited during the study period;
- names of ground investigation or contamination survey reports reviewed during the study period; and
- any other relevant site data.

Table 31: Site inspection notes

Walkover location Land parcel ref: AGL233287 and NGL486107	Details	
Date of walkover	5th February 2013	
Site location	London Autoparts scrapyard, Alperton Lane, London Borough of Ealing, HA0 1ER	
Site access	Entrance located off Alperton Lane	
Site description	The London Auto Parts Scrap Yard consists of two distinct areas, one for the storage of vehicles (AGL233287) and the second the crushing area of the site (NGL486107). At the entrance of the site is an area for staff/customer parking and a weighbridge	
Topography and surroundings - elevation in relation to surroundings, hummocks, breaks of slope etc.	The elevation of the site increases slightly from the centre towards the crushing area. The entrance of the site is level with the road	
Neighbouring site use (focussing on any potentially contaminative activities or sensitive receptors)	North	Large electrical substation, McGee construction services depot, the Veolia Waste Transfer Station and light industrial estates
	South	Railway line and disused pump island on parcel of land adjacent to the scrap yard on the other side of railway
	East	River Brent borders the site to the east, further east are light industrial estates and associated car parks
	West	Vacant parcel of cleared land opposite the entrance to the site – adjacent to existing railway line. Residential properties are located directly west of the site
Site buildings - extent, size, type and usage. Boiler rooms, electrical switchgear	Site office portacabins, shed containing scrap metal and used engines and body works shed	
Ground surfacing - type and condition	Hard surfacing covers the entirety of the site	
Vegetation - unusual growth or invasive species such as Japanese Knotweed	None observed	
Services - evidence of buried service	None observed	
Fuels or chemicals on-site	Above ground double bunded petrol tanks, located adjacent to the shed used for car body works and diesel tanks located within the same area	
Notes to include: a) tanks (above or below ground); b) containment systems (e.g. bund, drainage interceptors). Record condition and standing liquids; and c) refill points located inside	Further petrol tanks located at the rear of the body works shed area	

Walkover location Land parcel ref: AGL233287 and NGL486107	Details
bunds or on impermeable surfaces etc.	
Vehicle servicing or refuelling on-site - locations, tanks and inspection pits etc.	None observed
Waste generated/stored on-site - adequate storage and security/fly tipping	Waste associated with the operation of the site. Battery store located at the rear of the body works area and shed containing scrap metals and used engines
Surface water - on-site or nearby standing water	Mix of standing pools of water with oily sheen observed
Site drainage – location/evidence of flooding	Presence of drain within the crushing area that leads to an underground water storage area. Surface drain located where the site level reduces, drain located in front of an area used for car body works
Evidence of previous site investigations e.g. trial pits, borehole covers	None observed
Evidence of land contamination - discoloured ground, seepage of liquids, strong odours	Within the crushing area of the site, there are a number of oil drums and evidence of leaks on the hardstanding. In addition to the presence of lime powder distributed on the hard standing around scrap metal containers Crushing area – presence of oil on the hardstanding
Communications with on-site personnel	Communications with one of the operatives identified that within the crushing area had been no flooding issues, within the crushing area of the site the operative pointed out the location of drains to an underground storage area which collects any water which then goes off to sewer on a regular basis Site manager mentioned large sewer that runs under site offices, noted two storm drains
Summary of potential contamination sources	Evidence of leaks from oil drums and presence of oil on the hardstanding within the crushing area A number of bunded petrol and fuel tanks Battery storage area
Further comments	Pipework present around the shed and along the back fence. Tyre storage area located on site

Table 32: Veolia Brent Waste Transfer Station, Alperton Lane, site inspection notes

Walkover location Land parcel ref: NGL716943	Details	
Date of walkover	5th February 2013	
Site location	Veolia Brent Waste Transfer Station, London Borough of Brent	
Site access	Entrance located off Alperton Lane	
Site description	Operational waste transfer station with fuel filling point and parking area for waste collection vehicles. Large covered refuse storage shed for refuse/bulky items, surrounding the shed are smaller storage areas for recyclables such as glass, cardboards, co-mingled wastes, batteries, oxygen and other gas cylinders, used engine oil and waste electronic and electrical equipment. Made ground surrounds the refuse storage shed	
Topography and surroundings - elevation in relation to surroundings, hummocks, breaks of slope etc.	The site is level with the entrance road, elevation of the site decreases to the southeast when adjacent to the River Brent (external to the site)	
Neighbouring site use (in particular note any potentially contaminative activities or sensitive receptors)	North	Alperton Lane borders the site to the north. Further north is Alperton Sports Ground
	South	Auto parts scrap yard is located to the south. Rail line is located further south
	East	River Brent borders site to the east/southeast. Further east are warehouse properties and associated car park areas
	West	West Links Trading Estate. Current rail line runs along southwest of the site
Site buildings - extent, size, type and usage. Boiler rooms, electrical switchgear	Site office and waste storage sheds	
Ground surfacing – type and condition	Hard surfacing –concrete, good condition	
Vegetation - unusual growth or invasive species such as Japanese Knotweed	None observed within the perimeter of the site. Dense vegetation noted adjacent to the southeast of the site	
Services - evidence of buried service	None observed	

Walkover location Land parcel ref: NGL716943	Details
Fuels or chemicals on-site Notes to include: a) tanks (above or below ground); b) containment systems (e.g. bund, drainage interceptors). Record condition and standing liquids; and c) refill points located inside bunds or on impermeable surfaces etc.	Diesel storage area used to refill dust carts, including 23,000 litre, 100,000 litre and 6000 litre capacity bunded tanks. All bunds looked satisfactory and understood to have alarms installed
Vehicle servicing or refuelling on-site - locations, tanks and inspection pits etc.	As above
Waste generated/stored on-site - adequate storage and security/fly tipping	Notable wastes stored at the site include: Used engine oil (stated on layout plan but not seen during walkover) Batteries: lead and alkaline stored in a cage on hardstanding, no evidence of leakage Waste Electric and Electronic Equipment/TV and Fridges Oxygen and other gas cylinders
Surface water - on-site or nearby standing water	None observed
Site drainage – location/evidence of flooding	None observed
Evidence of previous site investigations e.g. trial pits, borehole covers	None observed
Evidence of land contamination - discoloured ground, seepage of liquids, strong odours	None observed within the site. Mixture of oil, mud and water present on the tow path that borders the site to the south/southeast
Communications with on-site personnel	None of note
Summary of potential contamination sources	Battery storage area on the southern side of the refuse shed, within the southern section of the site Diesel storage/fuel filling station within the centre of the site
Further comments	None

Table 33: Tarmac site, Park Royal Road, HAo 1ES site inspection notes

Walkover location Land parcel ref: AGL102720	Details	
Date of walkover	5th February 2013	
Site location	Tarmac site, located on Park Royal Road, London Borough of Ealing, HAo 1ES	
Site access	Entrance located off Park Royal Road, at the northern corner of the site	
Site description	The tarmac site is a triangular parcel of operational land and includes material storage areas associated with the works. An abandoned section of rail track runs within the site boundary on its southern edge adjacent to the current track alignment located external to the site's perimeter	
Topography and surroundings - elevation in relation to surroundings, hummocks, breaks of slope etc.	Elevation decreases from the northern section of the site and entrance (which is level with Park Royal Road) to the southern section of the site. The southern section of the site is level with the adjacent main line rail track	
Neighbouring site use (in particular note any potentially contaminative activities or sensitive receptors)	North	North of the site is bordered by Park Royal road and light industrial/commercial properties located in a number of trading estates surrounding the site
	South	Railway track borders the site to the south
	East	Site is bordered by Park Royal road and further east, light industrial/commercial buildings
	West	A trading estate borders the site to the west. Old diesel tank located to the rear of a warehouse/storage shed within the trading estate. Areas of scrap metal storage also noted, to the west of the site
Site buildings - extent, size, type and usage. Boiler rooms, electrical switchgear	Site office, site weighbridge and three silos associated with the works	
Ground surfacing – type and condition	Made ground-concrete, cracked in places. Majority of the lower section of the site the surface is covered in thick layer of sand	
Vegetation - evidence of distress, unusual growth or invasive species such as Japanese Knotweed	Vegetation (trees/scrub/grass) present along the perimeter of the site, no invasive plant species were noted during the site walkover	
Services - evidence of buried service	None observed	

Walkover location Land parcel ref: AGL102720	Details
Fuels or chemicals on-site Notes to include: a) tanks (above or below ground); b) containment systems (e.g. bund, drainage interceptors). Record condition and standing liquids; and c) refill points located inside bunds or on impermeable surfaces etc.	Chemical storage area located within the centre of the site adjacent to the three silos. Located in dedicated storage unit. No evidence of spillage or leakage. Storage area included hydrochloric acid, plasticiser and admixtures. Stored in double skinned tanks 4500 litre gas oil storage tank, located within the centre of the site
Vehicle servicing or refuelling on-site - locations, tanks and inspection pits etc.	None observed
Waste generated/stored on-site - adequate storage and security/fly tipping	None observed
Surface water - on-site or nearby standing water	Standing pools of water observed on the made ground
Site drainage - location/evidence of flooding	No drainage observed, extensive flooding within the southern section of the site. Abandoned section of the rail track had notable flooding
Evidence of previous site investigations e.g. trial pits, borehole covers	None observed
Evidence of land contamination - discoloured ground, seepage of liquids, strong odours	None observed
Communications with on-site personnel	Site operative confirmed no underground tanks
Summary of potential contamination sources	Chemical storage area and gas oil tank within the central section of the site Three silos within the central section of the site Disused rail track within the southern section of the site
Further comments	None

5 Geological sites of special scientific interest and local geological sites

5.1.1 There are no geo-conservation resources identified within the study area.

6 Mining and minerals data

- 6.1.1 There are no mining or mineral extraction sites within the study area. There are no minerals safeguarding areas or planned extraction sites indicated to be present within the study area by the minerals planning authority.

7 References

Defra and Environment Agency, (2002), *Potential contaminants for the assessment of land, R&D Publication*, Bristol, Environment Agency.

Environmental Protection Act 1990, Part IIA, Introduced in England on 1 April 2000, London, Her Majesty's Stationery Office.